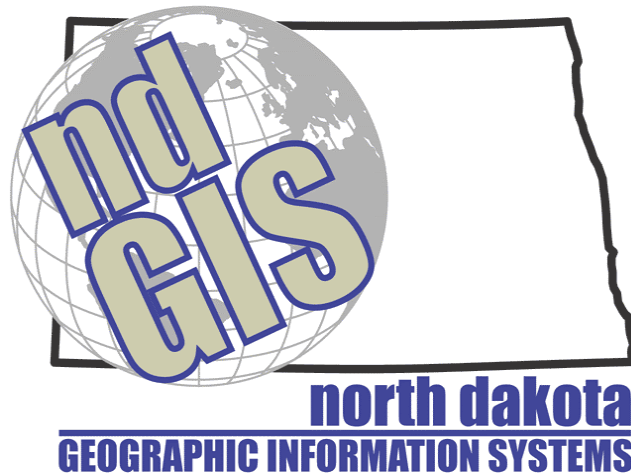# North Dakota GIS Program Report
To Governor Jack Dalrymple

July 1, 2012 – June 30, 2013

Executive Order 2001-06: "The committee shall issue a report to the Governor's office at the end of each fiscal year, detailing progress, and problems encountered with GIS development in the state."

Prepared By: Bob Nutsch
 GIS Manager
 Information Technology Department

Date of Publication: November 22, 2013

Executive Summary

The North Dakota Geographic Information System (GIS) Program continued to be successful during the July 1, 2012 – June 30, 2013 reporting period. The Information Technology Department (ITD) and the North Dakota GIS Technical Committee (GISTC) operate the GIS Hub, an infrastructure comprised of geospatial data storage, data services, and application interfaces. The GIS Hub supports state agencies in the development of their GIS and the dissemination of common interest data to other levels of government and the public.

The GISTC actively enhances the GIS Hub by adding new data and maintaining existing data such as high-resolution elevation data, aerial photography, and work force lodging. The GIS Hub also supports web-based applications that are available via a PC or a mobile device.

During the 2012-2013 reporting period there were over 5.1 million hits on the web services, a 61% increase over the previous reporting period. There are more than 234 database layers and other GIS datasets on the GIS Hub which consume about 13 terabytes of storage or the equivalent of over 2,765 DVDs

Looking to the future, challenges include the need for additional human resources and the management of cloud technologies.

GIS Program Governance

The GIS Technical Committee (GISTC) was established by Executive Order 1995-05 and re-affirmed by 2001-06. The primary role of the GISTC is to service the GIS Hub and provide a collaborative environment that supports state agencies' GIS. A secondary role is to coordinate among federal, state, tribal, local government and the private sector.

Seven agencies listed in the Executive Order:
- Department of Health
- Department of Transportation
- Game & Fish Department
- Geological Survey
- Information Technology Department
- Parks & Recreation Department
- State Water Commission

Associate Members:
- Department of Trust Lands
- Oil & Gas Division
- Public Service Commission
- Department of Emergency Services
- Department of Agriculture

Accomplishments

<u>Data Services and Applications</u>

GIS Hub data are streamed via web-based data services, making these data available to users inside and outside of state government. These data services can be used by people using GIS on a PC or mobile device.

An example of GIS Hub data available using a web-based data service is the work force lodging, a.k.a. "crew camps" data (Figure 1). This data originated from as an idea from the National Weather Service and through a partnership of state agencies, led by the Department of Health, the data was developed and is maintained. The data supports the safety and health of the crew camp residents and assists in providing advanced warning of severe weather.
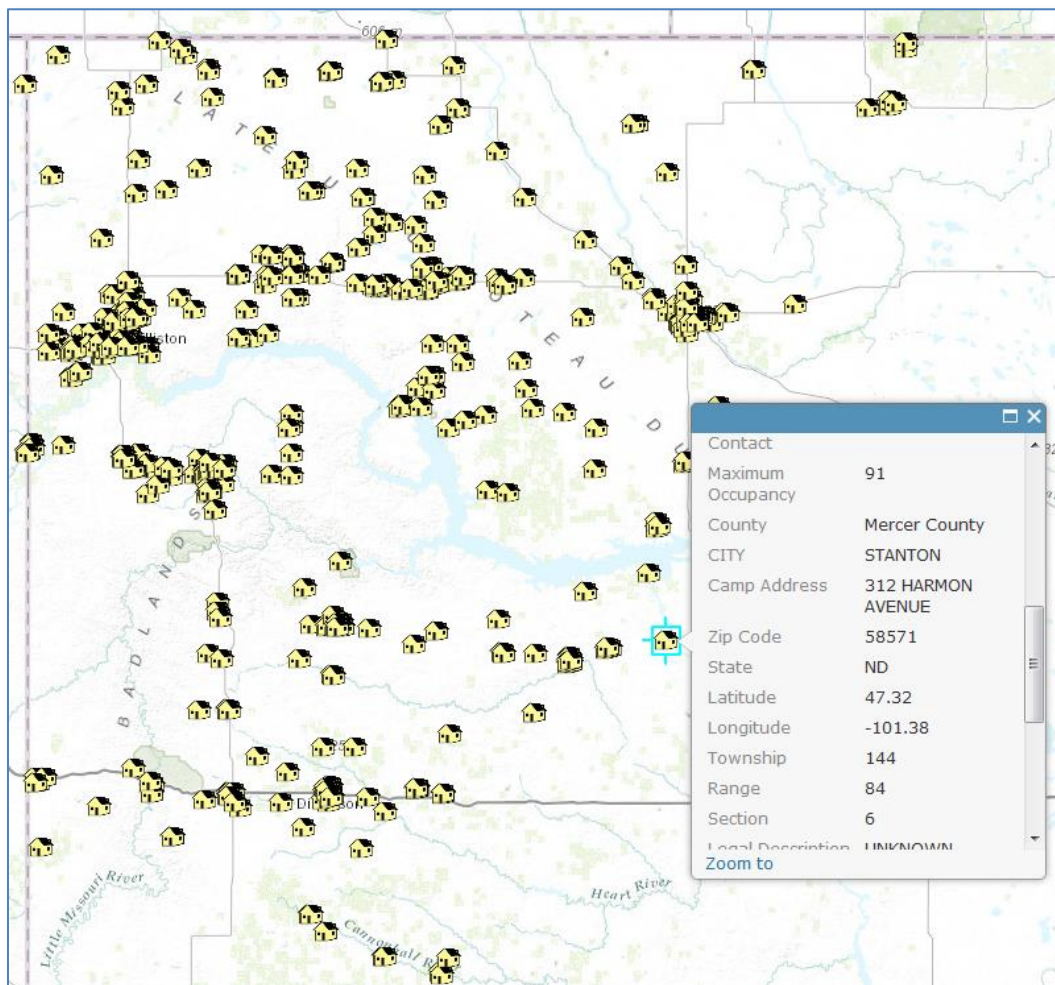

Figure 1. Work force lodging locations in western North Dakota

An example of a GIS application is the Department of Health's Surface Water Quality Data Portal (Figure 2). This tool allows one to view surface water locations across the state and to download sampling results.
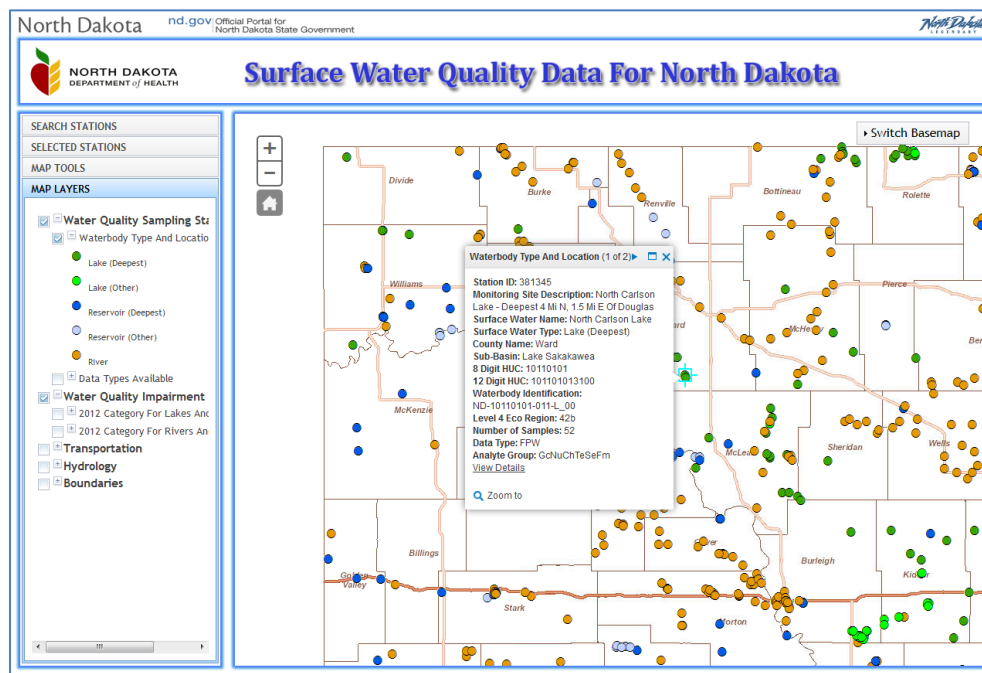

Figure 2. Surface Water Quality Data Portal

Another example of a GIS application is Visual ND (Figure 3), a term coined to describe North Dakota's version of a cloud-based tool that allows agencies to publish their maps and other information into a common area, providing an additional means for finding and sharing GIS applications, services, and data. This tool does not replace any GIS Hub components but rather compliments them.
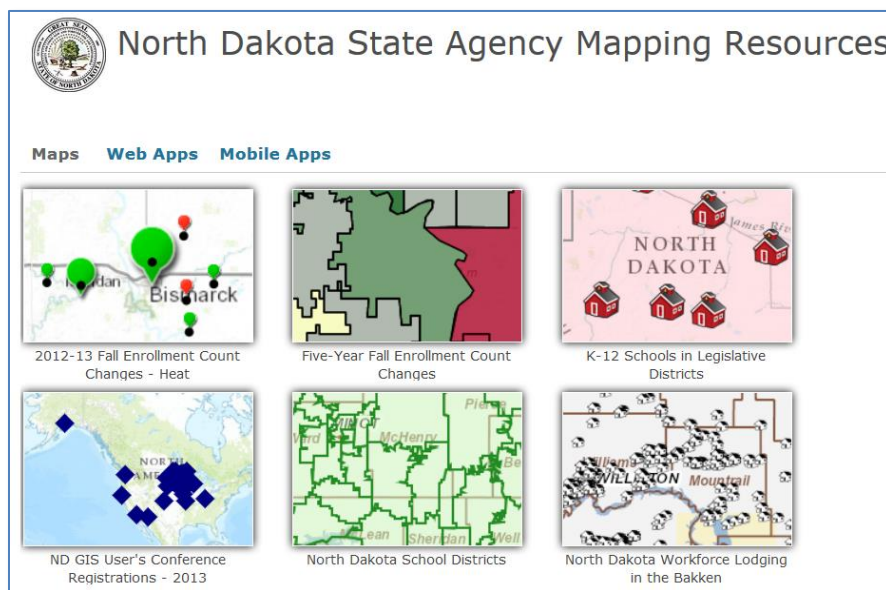

Figure 3. Visual ND portal

<u>Updated Data</u>

- Examples of updated/added data sets from state agency data stewards include:
  - Abandoned mines
  - Workforce lodging (a.k.a. "crew camps")
  - Watershed boundaries
  - Wellhead Protection Areas
  - Trauma centers
  - City boundaries
  - Transportation datasets from the NDDOT and the Census Bureau
  - School districts
  - K-12 school locations
  - Landuse/Landcover
  - Federal Communications Commission data
  - Aerial photography:
    - Bismarck/Mandan
    - City of Wahpeton
    - City of Grand Forks
    - Lake Audubon
    - Garrison Dam
    - Missouri River
    - Statewide

<u>Training and Education</u>

- **Workshops** – The GISTC helps to organize seminars and workshops which range from overview topics to detailed subject. The subject of the most recent workshop was Mobile GIS, geared towards state agency leadership.
- **Coordinated GIS training** – The GISTC organizes training as needed to cover a wide variety of GIS subjects. This training has saved state agencies over $75,000 in training costs alone and over an estimated $319,000 in combined training and travel costs since the beginning of this program in 2002. These classes will continue including the use of instructors teaching through the web and using software and data installed in the Cloud.

<u>Other Activities</u>

- North Dakota is now contributing to Esri's Community Maps Program (Figure 4). In this program, state agency GIS data from the GIS Hub is submitted to Esri. In turn, Esri uses that data to improve their base maps which are used by state agency users and others throughout the state. Esri is the company that provides most of the software used by state agencies.
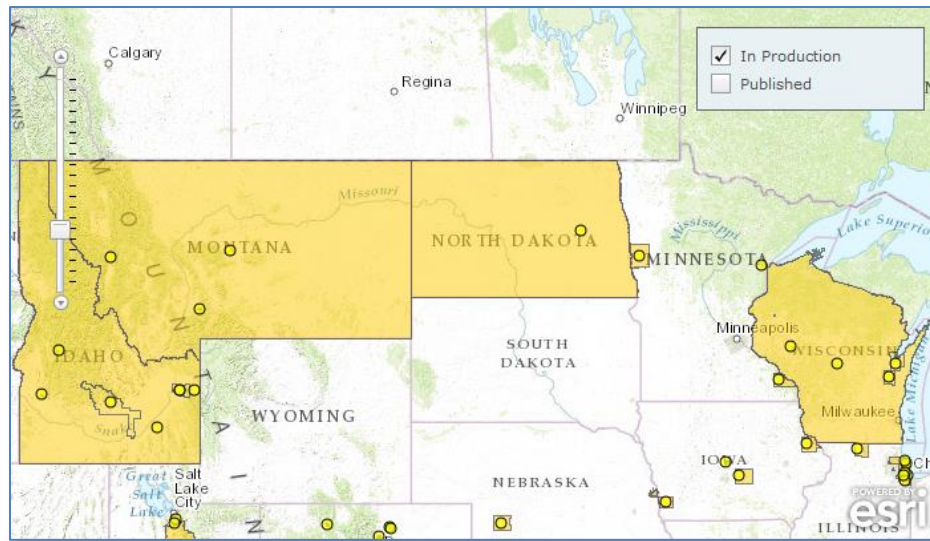
Figure 4. North Dakota is one of several states contributing data to
Community Maps

- The GISTC has begun a historical aerial photography project (Figure 5). As has been stated by a GISTC member, "the most valuable aerial photography is the newest photography and the oldest photography." The photography ranges from 1957 to 1962 and when the project is completed, the data will cover the state. Old photography is used primarily to help determine has changed over time.

Figure 5. 1957-1962 aerial photography

- The Department of Emergency Services (DES) "Base Map Project" will result in aerial photography, road centerlines, and address points, all of which will be used in emergency operations, management, and planning. The NDDOT is collecting high-resolution aerial and is digitizing road centerlines from the aerial photography. DES has contracted with a vendor to add address information to the road centerlines and to develop the address point data. This data set will reside on the GIS Hub and will be publicly distributed (minus confidential information) and within the parameters of the legislation that was passed in the last Legislative Session. Figure 6 shows an example of the photography which is already on the GIS Hub.

Figure 6. Department of Emergency Services base map project
aerial photography

Challenges

- **Human Resources** – GIS activities within the state agencies can be categorized into data, system, and coordination. Some of the agencies, including the Information Technology Department, would greatly benefit from having another person. For example, focusing on data development or system upgrades come at the expense of coordination with agencies and with local government. Reduced coordination can result in duplicated efforts and expenses and missed opportunities.
- **Cloud** – GIS is only one of many cloud-based services but it shares some of the same attributes. This includes authentication of users being maintained within the cloud rather than within the State's authentication systems, resulting in duplicated effort and lack of a centralized method of managing users' identities.